

What is claimed is:

1. A retracting mechanism of a zoom lens barrel including a first lens group, a second lens group and a third lens group, in that order from an object side, wherein said first lens group and said third lens group are integrally moved along an optical axis thereof during a zooming operation, and wherein at least one of said first lens group and said third lens group is moved relative to the other to reduce a distance therebetween when said zoom lens barrel is retracted, said retracting mechanism comprising:

a first lens group moving ring which is linearly guided along said optical axis, and supports said first lens group;

15 a second lens group moving ring which is linearly guided along said optical axis, and supports said second lens group;

a third lens group moving ring which is linearly guided along said optical axis, and supports said third lens group, said third lens group moving ring being allowed to freely approach said first lens group moving ring while being prevented from moving away from said first lens group moving ring beyond a moving limit relative to said first lens group moving ring;

25 a cam mechanism for moving said first lens group

moving ring and said second lens group moving ring in
respective moving manners independent of each other
along said optical axis;

a biasing device for biasing said third lens group
5 moving ring in a direction away from said first lens group
moving ring;

a linear guide through-slot formed on said second
lens group moving ring to be elongated in a direction
parallel to said optical axis;

10 a first linear guide projection formed on said
first lens group moving ring to be engaged in said linear
guide through-slot from outside said second lens group
moving ring, said first linear guide projection
including a hanging groove formed along a
15 substantially center thereof and elongated in a
direction parallel to said optical axis, a rear end of
said hanging groove being closed;

a second linear guide projection formed on said
third lens group moving ring to be engaged in said linear
20 guide through-slot from inside said second lens group
moving ring; and

a linear moving key projecting from a front end
of said second linear guide projection to be engaged in
said hanging groove,

25 wherein a rear moving limit of said third lens

group moving ring relative to said first lens group moving ring is determined by contact of said linear moving key with said closed rear end of said hanging groove.

5 2. The retracting mechanism according to claim 1, wherein said hanging groove comprises:

 a narrow-width groove portion which
communicatively connects with said linear guide through-slot; and

10 a wide-width groove portion which communicative
connects with said narrow-width groove portion, a width
of said wide-width groove portion in a circumferential
direction of said first lens group moving ring being
greater than that of said narrow-width groove portion,

15 wherein said linear moving key comprises:

 a neck portion which is engaged in said
narrow-width groove portion; and

 a head portion which is engaged in said wide-width
groove portion, a width of said head portion in a
20 circumferential direction of said first lens group
moving ring being greater than that of said neck portion.

 3. The retracting mechanism according to claim 1, wherein said second lens group moving ring comprises:

 a follower introducing through-slot which extends
25 orthogonal to said linear guide through-slot to

communicatively connect with said linear through-guide slot; and

5 a first follower introducing groove which extends parallel to said optical axis to communicative connect with said follower introducing through-slot, a front end of said first follower introducing groove communicatively connecting with said follower introducing through-slot, a rear end of said first follower introducing groove being open on a rear surface
10 of said second lens group moving ring,

wherein said first lens group moving ring comprises a second follower introducing groove which radially communicatively connects with said follower introducing through-slot and said hanging groove when
15 said first lens group moving ring is positioned at a specific position relative to said second lens group moving ring in said optical axis direction, and

wherein said linear moving key is inserted into said hanging groove via said follower introducing
20 through-slot, said first follower introducing groove and said second follower introducing groove during assembly of said zoom lens barrel.

4. The retracting mechanism according to claim 1, wherein said first lens group moving ring, said second
25 lens group moving ring and said third lens group moving

ring are coaxially arranged so that said first lens group moving ring is positioned around said second lens group moving ring, and so that said second lens group moving ring is positioned around said third lens group moving ring.
5 ring.

5. The retracting mechanism according to claim 1, wherein said cam mechanism comprises:

a cam ring which is positioned around said second lens group moving ring to be rotatable relative to said second lens group moving ring, and includes a plurality of outer cam grooves formed on an outer peripheral surface of said cam ring, and a plurality of inner cam grooves formed on an inner peripheral surface of said cam ring;
10 cam ring;

15 a plurality of inward cam followers which project radially inwards from said first lens group moving ring to be engaged in said plurality of outer cam grooves, respectively; and

a plurality of outward cam followers which project radially outwards from said second lens group moving ring to be engaged in said plurality of inner cam grooves, respectively.
20 respectively.

6. The retracting mechanism according to claim 1, wherein said biasing device comprises a compression coil spring.
25 coil spring.

7. The retracting mechanism according to claim 5, positions of said first lens group moving ring and said second lens group moving ring in said optical axis direction are adjusted by rotating said cam ring to make
5 said second follower introducing groove and said follower introducing through-slot aligned in said optical axis direction so that said second follower introducing grooves, said follower introducing through-slots and said first follower introducing
10 grooves form an L-shaped follower introducing channel, through which said linear moving key is inserted into said hanging groove, when said third lens group moving ring is installed in said zoom lens barrel during assembly.